



Cattle Herd Monitoring

E-IOT cattle herd monitoring combines wearable sensor nodes, solar energy harvesting and NeoMesh wireless communication to monitor animal presence and activity. The animals form a moving sensor network, sharing access to the cloud through selected cellular gateways. Fixed, animal-carried or drone-mounted gateways provide flexible data-collection options, reducing the need for permanent communication infrastructure across grazing areas.

Products shown

- Solar-powered wearable sensor node — a compact assembly incorporating a photovoltaic panel for energy harvesting.

- **NeoMesh sensor node with exposed electronics** — shows the wireless module, control electronics and energy-storage component within a wearable housing.
- **Battery-powered cellular gateway assembly** — provides the wide-area communication element for forwarding collected information to the cloud.
- **Herd monitoring application concept** — illustrates ear-tag sensors, a cattle-bell gateway arrangement and optional drone-assisted data collection.

Product features and operation

A wireless network that moves with the herd

Each equipped animal carries a uniquely identified NeoMesh node. Nearby nodes exchange and relay messages, allowing data to travel through the herd towards an available gateway.

As animals move, the available radio links change. The mesh architecture accommodates this changing arrangement wherever sufficient connections remain between neighboring nodes.

This approach allows many animals to share a smaller number of cellular uplinks. Each sensor node can focus on local measurement and low-power communication, while selected gateways handle cloud reporting.

Animal presence and herd membership

Periodic reports identify which sensor nodes remain reachable through the network. The monitoring application can associate each node with an animal and maintain a record of its latest communication.

If a node stops reporting for a configured period, the system can flag it for attention. This may indicate that an animal has moved away from the connected group, but it can also result from terrain, radio obstruction or insufficient stored energy.

Mesh presence therefore provides useful information about herd membership and connectivity. Exact geographical coordinates require a separate positioning capability; they cannot be derived from network membership alone.

Activity monitoring

Motion sensing provides a basis for monitoring animal activity. Firmware can summarize movement into activity indicators or pedometer-style measurements and transmit compact reports at selected intervals.

Historical data allows operators to compare an animal's current activity with its previous pattern. An unusual decrease or increase can prompt closer observation.

Interpretation depends on sensor placement and the activity algorithm. An ear-mounted sensor measures head movement as well as movement associated with walking, so reliable step estimates require application-specific validation.

Solar harvesting and stored energy

The solar-equipped node harvests light to support sensing and wireless communication. A supercapacitor-based energy-storage design can supply the electronics between harvesting opportunities and reduce reliance on replaceable batteries.

Operating autonomy depends on available light, panel orientation, shading, reporting frequency and network activity. Firmware can balance measurement and communication intervals against the available energy.

This approach is particularly attractive for outdoor herds, where reducing routine battery replacement can simplify maintenance.

Flexible gateway arrangements

The system concept supports several ways of collecting data from the herd.

An **animal-carried gateway**, mounted in a suitable collar or cattle-bell assembly, can travel with the group and forward readings when cellular coverage is available.

A **fixed gateway** at a barn, watering point or feeding area can collect reports when animals come within network reach.

A **drone-mounted gateway** can provide a temporary collection opportunity over remote grazing areas. Where historical readings must be retrieved between visits, the nodes need suitable local buffering and a configured data-transfer procedure.

Gateway quantity and placement depend on herd separation, terrain, radio conditions and the required reporting interval.

Cloud visibility and notifications

The E-IOT cloud can bring animal identifiers, activity reports, last-seen timestamps and available device diagnostics into a common dashboard.

Configured rules can highlight prolonged communication gaps or significant changes in activity. These notifications help operators prioritize checks and focus attention on animals or devices that require investigation.

Reporting latency depends on the gateway arrangement. A continuously connected gateway supports more frequent updates, while a visiting drone or a gateway at a watering point provides information during collection opportunities.

Typical applications

- Presence monitoring for free-ranging cattle.
- Activity tracking and identification of unusual movement patterns.
- Herd monitoring with limited fixed infrastructure.
- Shared cellular connectivity for wearable livestock sensors.
- Data collection at barns, feeding areas and watering points.
- Drone-assisted monitoring of remote grazing areas.
- Solar-powered livestock IoT demonstrations and customized deployments.